SUBARU

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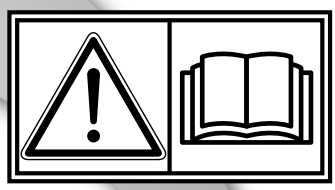

SUBARU

FUJI HEAVY INDUSTRIES LTD.,
TOKYO JAPAN

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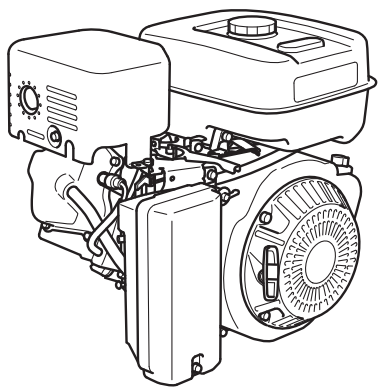
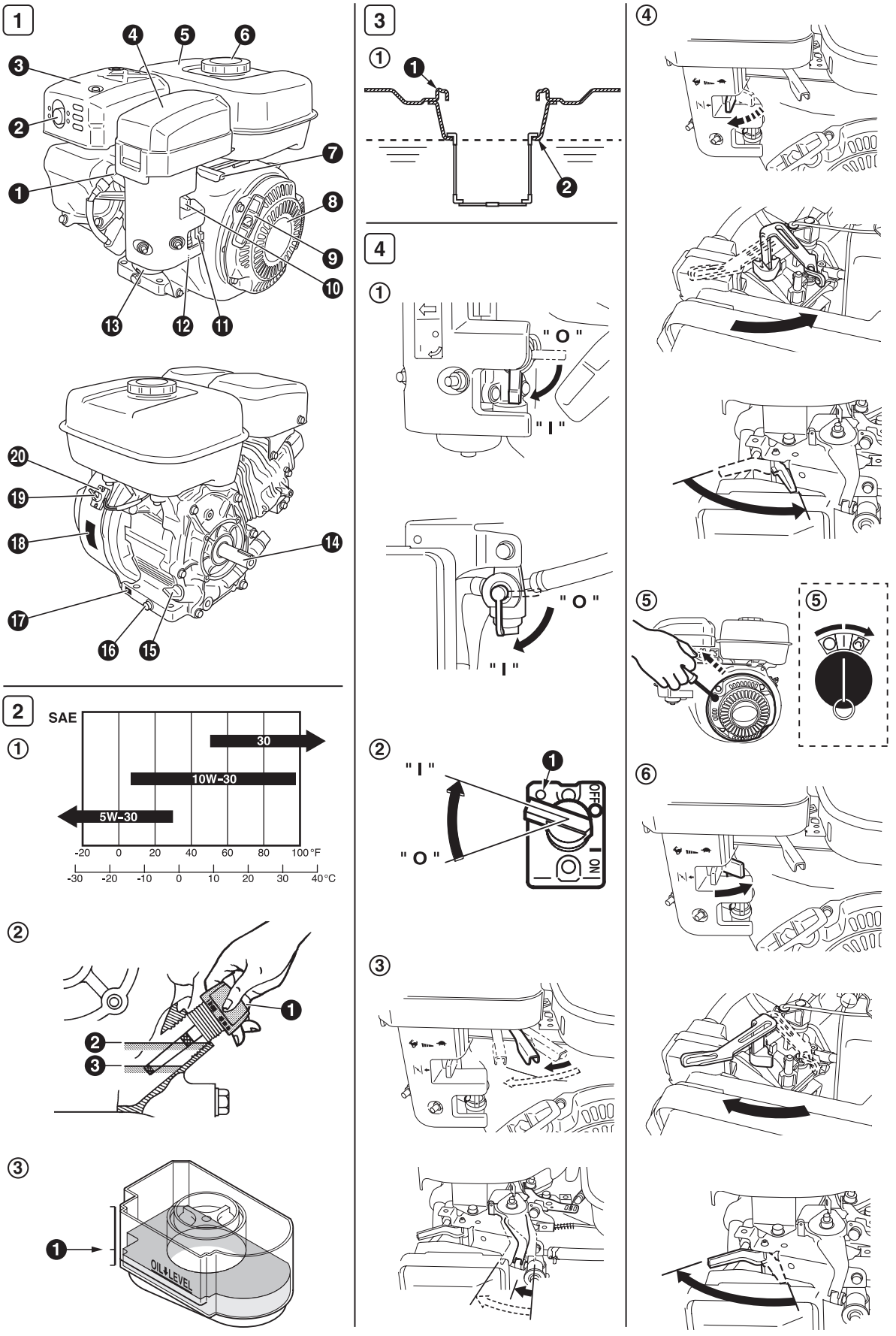
取 扱 説 明 書	JP
INSTRUCTIONS FOR USE	EN
INSTRUCTIONS FOR USE (USA only)	US
MANUEL D'UTILISATION	FR
BEDIENUNGSANLEITUNG	DE
GEBRUIKSAANWIJZING	NL
MANUAL DE INSTRUCCIONES	ES
MANUALE D'USO E MANUTENZIONE	IT
MANUAL DE INSTRUÇÕES	PT
ΟΔΗΓΙΕΣ ΧΡΗΣΕΩΣ ΚΑΙ ΣΥΝΤΗΡΗΣΕΩΣ ΚΙΝΗΤΗΡΩΝ	GR
INSTRUKTIONSBOK	NO
BRUKSANVISNING	SE
KÄYTTÖ-JA HUOLTO-OHJEET	FI
BRUGSANVISNING	DK
РУКОВОДСТВО ПО ЭКСПЛУАТАЦИИ	RU
INSTRUKCJA OBSŁUGI DO SILNIKÓW	PL
使 用 说 明 书	CN
إرشادات الإستعمال	AR



Robin Engines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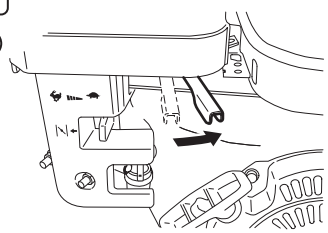

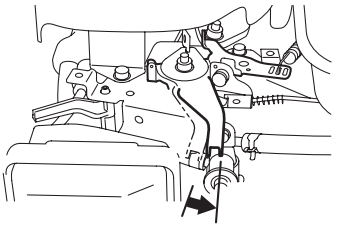

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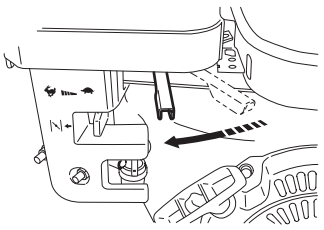

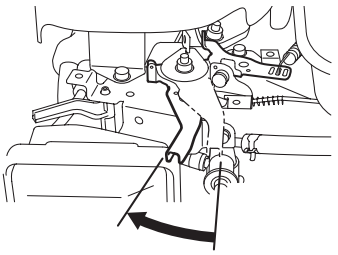

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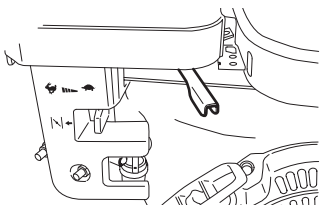

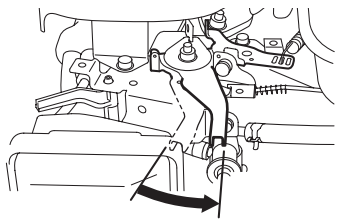

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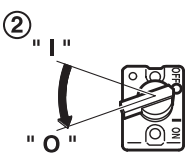

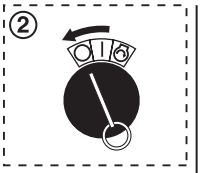

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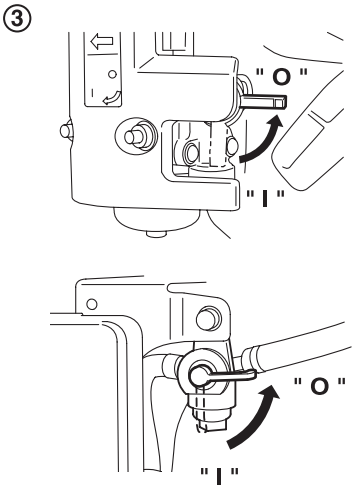

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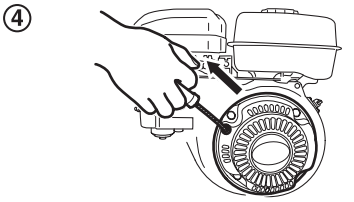

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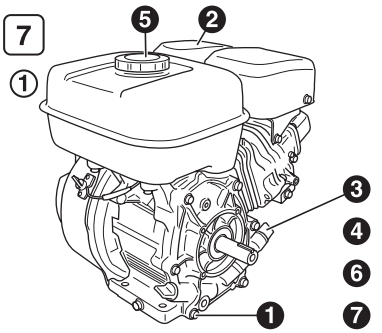

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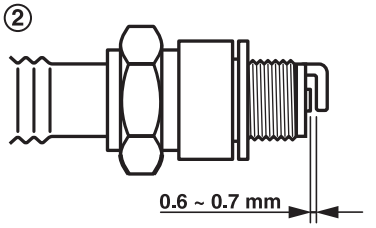

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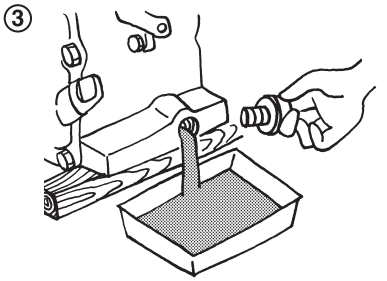

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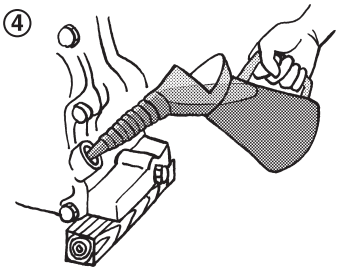

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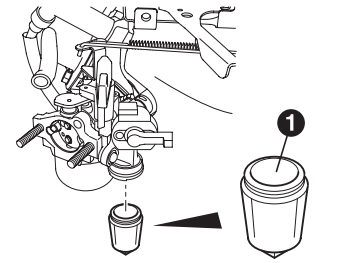

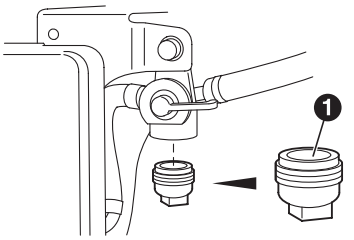

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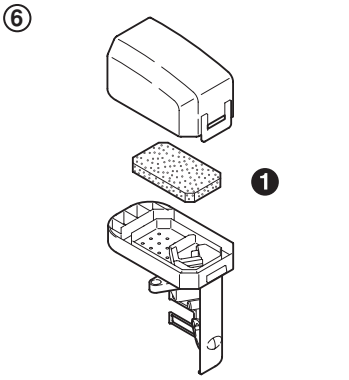

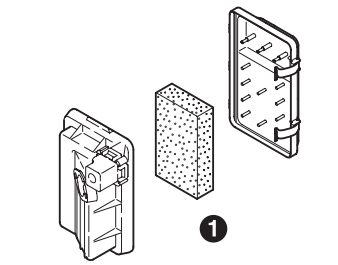

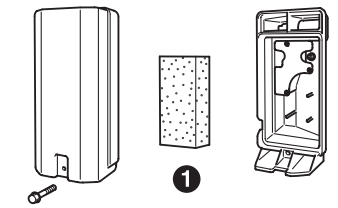

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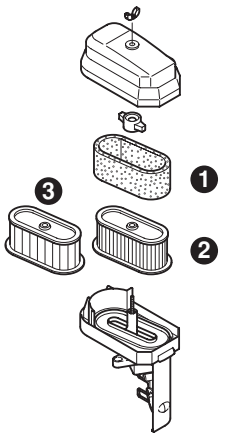

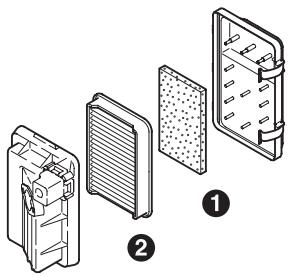

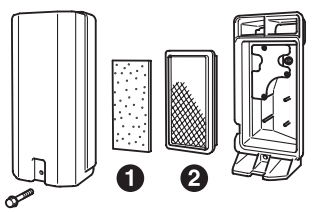

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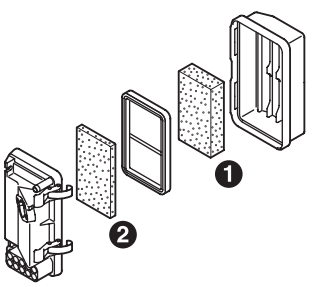

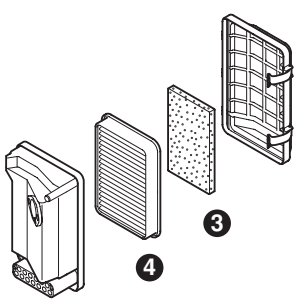

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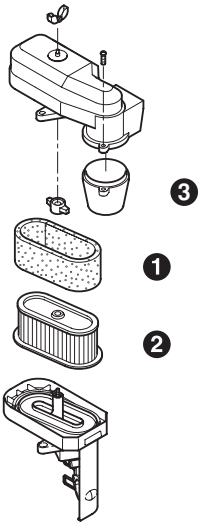

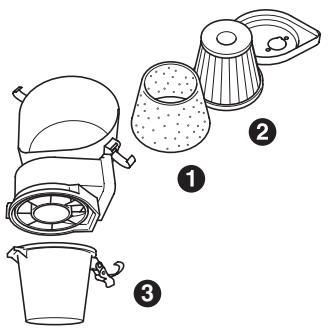

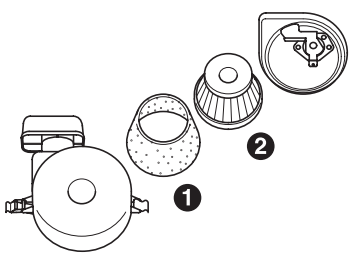

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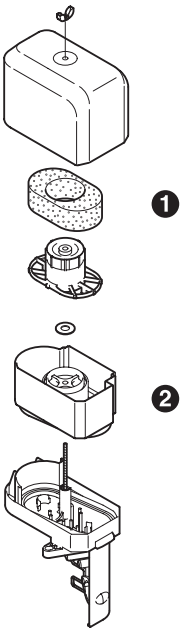

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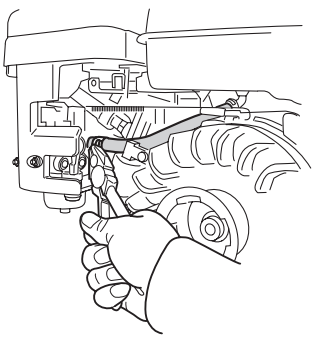

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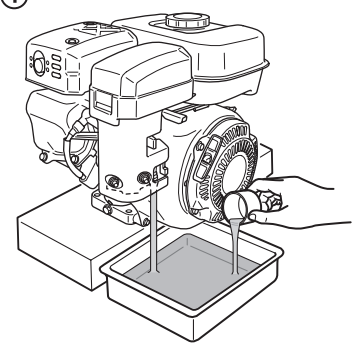


(California Proposition 65)

⚠ WARNING: ⚠

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

NOTICE

FEDERAL EMISSION COMPONENT DEFECT WARRANTY and CALIFORNIA EMISSION CONTROL WARRANTY are applicable to only those engines/generators complied with EPA (Environmental Protection Agency) and CARB (California Air Resources Board) emission regulations in the U.S.A.

US

NOTICE

To the engines/generators exported to and used in the countries other than the U.S.A., warranty service shall be performed by the distributor in each country in accordance with the standard Robin engine/generator warranty policy as applicable.

(California only)

AIR INDEX

To show compliance with California emission regulations, a hangtag has been provided displaying the Air Index level and durability period of this engine.

The Air Index level defines how clean an engine's exhaust is over a period of time. A bar graph scaled from "0" (most clean) to "10" (least clean) is used to show an engine's Air Index level. A lower Air Index level represents cleaner exhaust from an engine.

The period of time (in hours) that the Air Index level is measured is known as the durability period. Depending on the size of the engine, a selection of time periods can be used to measure the Air Index level (see below).

Descriptive Term		Applicable to Emissions Durability Period
Moderate	-	50 hours (engine from 0 to 80 cc)
		125 hours (engine greater than 80 cc)
Intermediate	-	125 hours (engine from 0 to 80 cc)
		250 hours (engine greater than 80 cc)
Extended	-	300 hours (engine from 0 to 80 cc)
		500 hours (engine greater than 80 cc)

Notice : This hangtag must remain on this engine or piece of equipment, and only be removed by the ultimate purchaser before operation.

FEDERAL EMISSIONS COMPONENT DEFECT WARRANTY

EMISSIONS COMPONENT DEFECT WARRANTY COVERAGE – This emission warranty is applicable in all States, except the state of California.

Fuji Heavy Industries Ltd. and Robin America Inc., Wood Dale Illinois, (herein "ROBIN AMERICA") warrant(s) to the initial retail purchaser and each subsequent owner, that this Nonroad engine (herein "engine") has been designed, built, and equipped to conform at the time of initial sale to all applicable regulations of the U.S.
Environmental Protection Agency (EPA), and that the engine is free of defects in materials and workmanship which would cause this engine to fail to conform with EPA regulations during its warranty period.

For the components listed under PARTS COVERED, the service dealer authorized by ROBIN AMERICA will, at no cost to you, make the necessary diagnosis, repair, or replacement necessary to ensure that the engine complies with applicable U.S. EPA regulations.

EMISSION COMPONENT DEFECT WARRANTY PERIOD

The warranty period for this engine begins on the date of sale to the initial purchaser and continues for a period of two years.

PARTS COVERED

US

Listed below are the parts covered by the Emission Components Defect Warranty. Some of the parts listed below may require scheduled maintenance and are warranted up to the first scheduled replacement point for that part.

(1) Fuel Metering System
- (i) Carburetor and internal parts (and/or pressure regulator or fuel injection system).
- (ii) Air/fuel ratio feedback and control system, if applicable.
- (iii) Cold start enrichment system, if applicable.
- (iv) Regulator assy (gaseous fuel, if applicable)

(2) Air Induction System
- (i) Intake manifold, if applicable
- (ii) Air filter.

(3) Ignition System
- (i) Spark plugs.
- (ii) Magneto or electronic ignition system.
- (iii) Spark advance/retard system, if applicable.

(4) Exhaust manifold, if applicable

(5) Miscellaneous Items Used in Above Systems
- (i) Electronic controls, if applicable
- (ii) Hoses, belts, connectors, and assemblies.
- (iii) Filter lock assy (gaseous fuel, if applicable)

OBTAINING WARRANTY SERVICE

To obtain warranty service, take your engine to the nearest authorized Robin America service dealer . Bring your sales receipts indicating date of purchase for this engine. The service dealer authorized by ROBIN AMERICA will perform the necessary repairs or adjustments within a reasonable amount of time and furnish you with a copy of the repair order. All parts and accessories replaced under this warranty become the property of ROBIN AMERICA.

WHAT IS NOT COVERED

*Conditions resulting from tampering, misuse, improper adjustment (unless they were made by the service dealer authorized by ROBIN AMERICA during a warranty repair), alteration, accident, failure to use the recommended fuel and oil, or not performing required maintenance services.

*The replacement parts used for required maintenance services.

*Consequential damages such as loss of time, inconvenience, loss of use of the engine or equipment, etc.

*Diagnosis and inspection charges that do not result in warranty-eligible service being performed.

*Any non-authorized replacement part, or malfunction of authorized parts due to use of non-authorized parts.

OWNER'S WARRANTY RESPONSIBILITIES

As the engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. ROBIN AMERICA recommends that you retain all receipts covering maintenance on your engine, but ROBIN AMERICA cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the engine owner, you should however be aware that ROBIN AMERICA may deny warranty coverage if your engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

You are responsible for presenting your engine to the nearest service dealer authorized by ROBIN AMERICA when a problem exists.

If you have any questions regarding your warranty rights and responsibilities, you should contact the Robin America customer service department at 1-630-350-8200 for the information.

THINGS YOU SHOULD KNOW ABOUT THE EMISSION CONTROL SYSTEM WARRANTY MAINTENANCE AND REPAIRS

You are responsible for the proper maintenance of the engine.
You should keep all receipts and maintenance records covering the performance of regular maintenance in the event questions arise. These receipts and maintenance records should be transferred to each subsequent owner of the engine. ROBIN AMERICA reserves the right to deny warranty coverage if the engine has not been properly maintained. Warranty claims will not be denied, however, solely because of the lack of required maintenance or failure to keep maintenance records.

MAINTENANCE, REPLACEMENT OR REPAIR OF EMISSION CONTROL DEVICES AND SYSTEMS MAY BE PERFORMED BY ANY REPAIR ESTABLISHMENT OR INDIVIDUAL;
HOWEVER, WARRANTY REPAIRS MUST BE PERFORMED BY A SERVICE DEALER AUTHORIZED BY ROBIN AMERICA. THE USE OF PARTS THAT ARE NOT EQUIVALENT IN PERFORMANCE AND DURABILITY TO AUTHORIZED PARTS MAY IMPAIR THE EFFECTIVENESS OF THE EMISSION CONTROL SYSTEM AND MAY HAVE A BEARING ON THE OUTCOME OF A WARRANTY CLAIM.

If other than the parts authorized by ROBIN AMERICA are used for maintenance replacements or for the repair of components affecting emission control, you should assure yourself that such parts are warranted by their manufacturer to be equivalent to the parts authorized by ROBIN AMERICA in their performance and durability.

HOW TO MAKE A CLAIM

All repair qualifying under this limited warranty must be performed by a service dealer authorized by ROBIN AMERICA. In the event that any emission-related part is found to be defective during the warranty period, you shall notify Robin America customer service department at 1-630-350-8200 and you will be advised of the appropriate warranty service dealer or service providers where the warranty repair can be performed.

FOREWORD

Thank you very much for purchasing a **ROBIN ENGINE**.

Your **ROBIN ENGINE** can supply the power to operate various sorts of machines and equipment.

Please take a moment to familiarize yourself with the proper operation and maintenance procedures in order to maximize the safe and efficient use of this product.

Keep this owner's manual at hand, so that you can refer to it at any time.

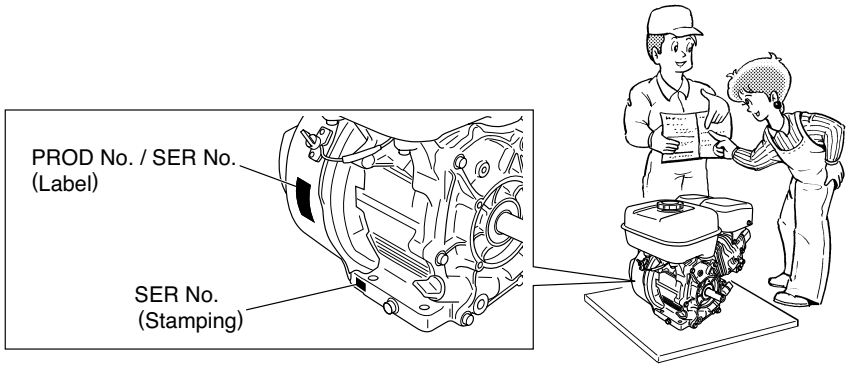
Due to constant efforts to improve our products, certain procedures and specifications are subject to change without notice.

When ordering spare parts, always give us the MODEL, PRODUCTION NUMBER and SERIAL NUMBER of your engine.

Please fill in the following blanks after checking the production number on your engine. (Location of label is different depending on the engine specification.)

US

PROD No.	SER No.



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NOTE **Please refer to the illustrations on the back page of the front cover or back cover for Fig. 1 to 8 indicated in the sentence.**

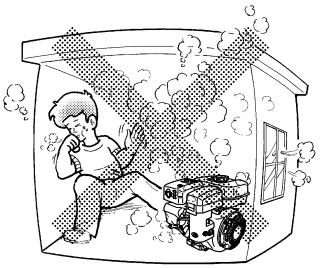
1. SAFETY PRECAUTIONS

Please make sure you review each precaution carefully.
Pay special attention to statement preceded by the following words.

⚠ WARNING **"WARNING" indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.**

⚠ CAUTION **"CAUTION" indicates a possibility of personal injury or equipment damage if instructions are not followed.**

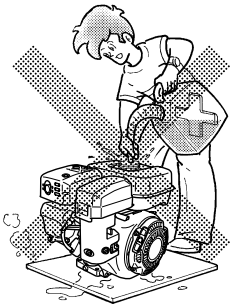
⚠ WARNING : EXHAUST PRECAUTIONS



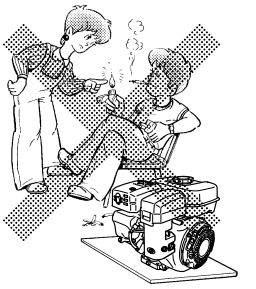
- Never inhale exhaust gasses.
  They contain carbon monoxide, a colorless, odorless and extremely dangerous gas which can cause unconsciousness or death.
- Never operate the engine indoors or in a poorly ventilated area, such as tunnel, cave, etc.
- Exercise extreme care when operating the engine near people or animals.
- Keep the exhaust pipe free of foreign objects.

US

⚠ WARNING : REFUELING PRECAUTIONS

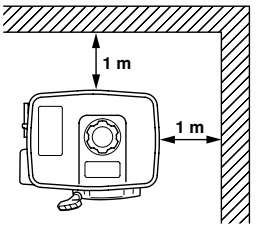


- **Gasoline is extremely flammable and its vapors can explode if ignited.**
- Do not refuel indoors or in a poorly ventilated area.
- Be sure to stop the engine prior to refueling.
- Do not remove fuel tank cap nor fill fuel tank while engine is hot or running.
  Allow engine to cool at least 2 minutes before refueling.
- Do not overfill the fuel tank.
- If fuel is spilt, wipe it away carefully and wait until the fuel has dried before starting the engine.
- After refueling, make sure that the fuel cap is secured to prevent spillage.



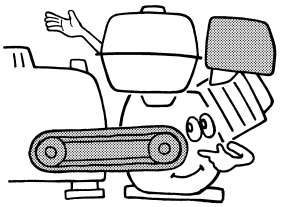
⚠ WARNING : FIRE PREVENTION

- Do not operate the engine while smoking or near an open flame.
- Do not use around dry brush, twigs, cloth rags, or other flammable materials.
- Keep cooling air intake (recoil starter area) and muffler side of the engine at least 1 meter (3 feet) away from buildings, obstructions and other burnable objects.
- Keep the engine away from flammables and other hazardous materials (trash, rags, lubricants, explosives).



⚠ WARNING : OTHER SAFETY PRECAUTIONS

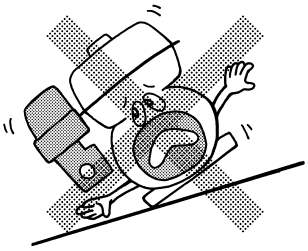
- **Place the protective covers over the rotating parts.**
  If rotating parts such as the drive shaft, pulley, belt, etc. are left exposed, they are potentially hazardous. To prevent injury, equip them with protective covers or shrouds.
- **Be careful of hot parts.**
  The muffler and other engine parts become very hot while the engine is running or just after it has stopped. Operate the engine in a safe area and keep children away from the running engine.



■ Do not touch the spark plug and ignition cable when starting and operating the engine.

■ Never make adjustments on the machinery while it is connected to the engine, without first removing the ignition cable from the spark plug. Turning the crankshaft by hand during adjusting or cleaning might start the engine, and cause serious injury to the operator.

■ Operate the engine on a stable, level surface.
If the engine is tilted, fuel spillage may result.

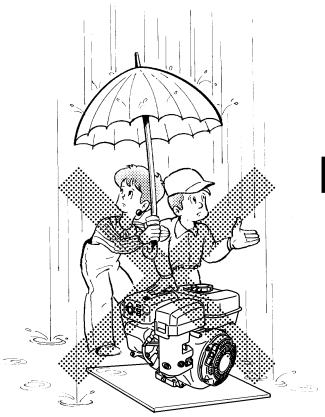


NOTE
Operating the engine at a steep incline may cause seizure due to improper lubrication even with a maximum oil level.

■ Do not transport the engine with fuel in tank or with fuel strainer cock open.

■ Do not move the engine while in operation when it has been removed from the equipment.

■ Keep the unit dry (do not operate it in rainy conditions).



US

⚠ WARNING : WHEN CHARGING THE BATTERY

■ Battery electrolyte contains sulphuric acid. Protect your eyes, skin and clothing. In case of contact, flush thoroughly with water and get prompt medical attention, especially if your eyes are affected.

■ Batteries generate hydrogen gas, which can be highly explosive. Do not smoke or allow flames or sparks near a battery, especially during charging.

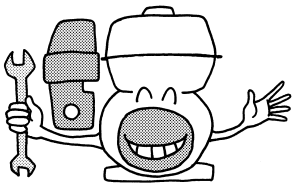
■ Charge the battery in a fully ventilated location.

■ Be sure to confirm Battery polarity.

⚠ CAUTION : PRE-OPERATION CHECKS

■ Carefully check fuel hoses and joints for looseness and fuel leakage. Leaked fuel creates a potentially dangerous situation.

■ Check bolts and nuts for looseness. A loose bolt or nut may cause serious engine trouble.



■ Check the engine oil and refill if necessary.

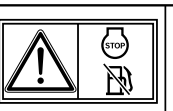
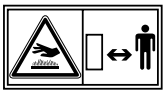
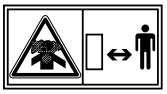
■ Check the fuel level and refill if necessary. Take care not to overfill the tank.

■ Keep cylinder fins and recoil starter free of dirt, grass and other debris.

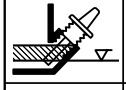
■ Wear snug fitting working clothes when operating the engine.
Loose aprons, towels, belt, etc., may be caught in the engine or drive train, causing a dangerous situation.

SYMBOLS

SY2241

	Read manual.		*Shutt off fuel valve when the engine is not in use.*
	*Stay clear of the hot surface.*		*Check for leakage from hose and fittings.*
	*Exhaust gas is poisonous. Do not operate in an unventilated room or enclosed area.*		*Fire, open flame and smoking prohibited.*
	Stop the engine before refueling.		*HOT, avoid touching the hot area.*

US

	On (Run)		*Engine start (Electric start)*		*Fuel (gasoline)*
	Off (Stop)		*Engine stop*		*Fuel shut-off*
	Engine oil		*Fast*		*Fuel system failure / malfunction*
	*Add oil*		*Slow*		*Choke*
	Battery		*Plus ; positive polarity*		*Minus ; negative polarity*

2. COMPONENTS

(See Fig. 1)

NOTE **Please refer to the illustrations on the back page of the front cover or back cover for Fig. 1 to 8 indicated in the sentence.**

❶ SPARK PLUG
❷ EXHAUST OUTLET
❸ MUFFLER COVER
❹ AIR CLEANER
❺ FUEL TANK
❻ FUEL TANK CAP (FUEL FILLER)
❼ SPEED CONTROL LEVER
❽ RECOIL STARTER
❾ STARTER HANDLE
❿ CHOKE LEVER
⓫ FUEL COCK
⓬ FUEL CUP
⓭ CARBURETOR
⓮ P.T.O. SHAFT
⓯ OIL GAUGE (OIL FILLER)
⓰ OIL DRAIN PLUG
⓱ ENGINE SERIAL NO. (STAMPING)
⓲ ENGINE NAME LABEL (SPEC. No.)
⓳ STOP SWITCH
⓴ OIL SENSOR UNIT

3. PRE-OPERATION CHECKS

NOTE
Engine shipped from our factory is without oil.
Before starting engine, fill with oil. Do not over-fill.

1. CHECK ENGINE OIL (See Fig. 2)

Before checking or refilling engine oil, be sure the engine is located on stable, level surface and stopped.

- Do not screw the oil gauge into the oil filler neck to check oil level. If the oil level is low, refill to the upper level with the following recommended oil.
- Use 4-stroke automotive detergent oil of API service class SE or higher grade.
- Select the viscosity based on the air temperature at the time of operation as shown in the table. (See Fig.2-①)

Oil capacity (Upper level) :	(L)
EX13/17/21	0.6
EX27/30	1.0
EX35/40	1.2

Explanation of Fig.2-②

❶ Oil Gauge ❷ Upper Level
❸ Lower Level

- For the engine with Oil Bath type air cleaner, fill the engine oil upto the specified level of the oil bath (oil pan). (See Fig.2-③-❶)

Oil Capacity in the Oil Bath (oil pan) :
EX13/17/21 . . . . . About 55 mL

2. CHECK FUEL (See Fig. 3)

⚠ WARNING

Do not refuel while smoking, near an open flame or other such potential fire hazards. Otherwise fire accident may occur.

NOTE
THIS ENGINE IS CERTIFIED TO OPERATE ON AUTOMOTIVE UNLEADED GASOLINE.

Fuel tank capacity :	(L)		
EX13	2.7	EX17	3.6
EX21	3.6	EX27	6.1
EX35	7.0	EX40	7.0

- Stop the engine and open the cap.
- Close the fuel cock before filling the fuel tank.
- Do not fill above the top of the fuel filter screen (marked ❷), or the fuel may overflow when it heats up later and expands.
- When filling the fuel tank, always use the fuel filter screen.
- After refueling, tighten the fuel cap (rotate clockwise) until it makes a physical stop, there will be a relief in resistance just before the physical stop.
  This will form a vapor seal between the tank and fuel cap.
- Wipe off any spilled fuel before starting the engine.

4. ELECTRIC STARTER MODELS

US

For electric starter operation, proper electric wiring arrangements are needed before normal engine operation.

1. BATTERY

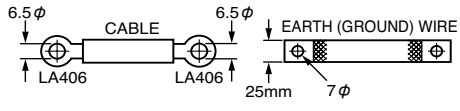
- Use a battery rated 12V-24AH or larger.

⚠ WARNING

- **Charge the battery in a fully ventilated location.**
- **Batteries generate hydrogen gas, which can be highly explosive. Do not smoke or allow flames or sparks near a battery, especially during charging.**
- **Be sure to confirm Battery polarity. Connect positive (+) terminal first when mounting battery, and disconnect negative (–) terminal first when dismounting.**
- **Battery electrolyte contains sulphuric acid. Protect your eyes, skin and clothing. In case of contact, flush thoroughly with water and get prompt medical attention, especially if your eyes are affected.**

2. BATTERY CABLE

- Use a proper cable and ground wire to connect battery.
- For GROUND WIRE, use a flat braided wire of 20 sq. mm. or larger sectional area.



Cable length	Cable dia.	Wire gauge		
		AWG (BS) BWG	SAE	JIS
Less than 1.5m	7.3 mm	1	6	AV15
1.5 m to 2.5 m	8.4 mm	0	4	AV20
2.5 m to 4 m	10.8 mm	3/0	2	AV30

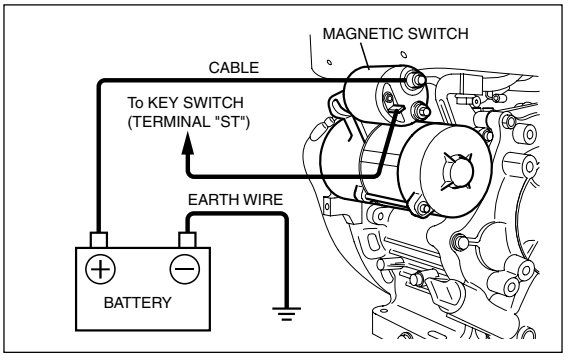
3. KEY SWITCH CABLE

If a remote key switch is used, select wires of proper gauge to connect it and magnetic switch of the engine.

Cable length	Cable dia.	Wire gauge		
		AWG (BS)	BWG	JIS
Less than 1.5 m	1.5 mm	14	16	AV1.25
1.5 m to 3 m	1.9 mm	12	14	AV2
3 m to 5 m	2.4 mm	10	13	AV3

4. WIRING

US



(1) Connect positive (+) terminal of the magnetic switch and positive (+) terminal of the battery with battery cable.

⚠ CAUTION

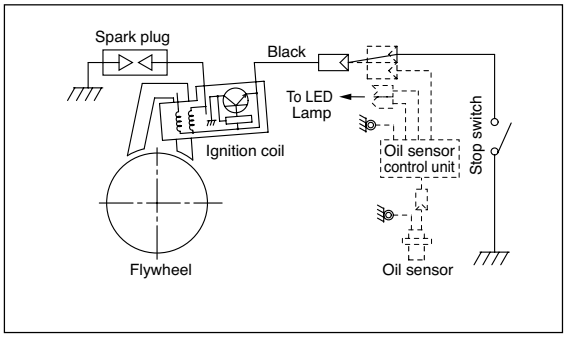
Make sure the polarity of battery terminals. Never connect the battery cable with the battery negative (-) terminal.
When connecting the battery cable with the battery negative (-) terminal, diode rectifier chips will be burned out or damaged in a moment.

(2) Ground negative terminal of the battery to the engine body or machine with ground wire.

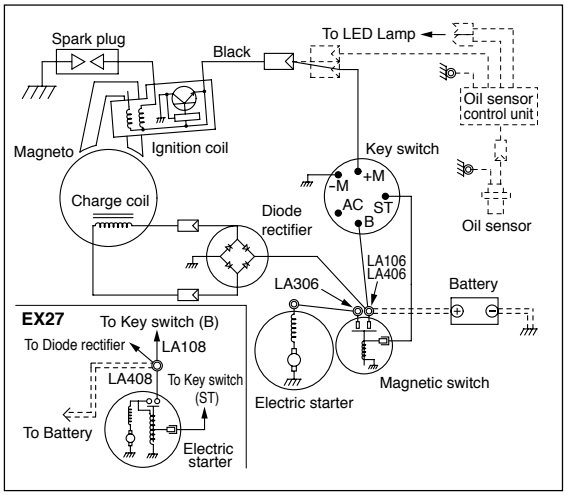
(3) When installing the key switch on the machine, install with its drain hole at the bottom.

NOTE
Tighten bolts and nuts on terminals securely so that they will not be loosened by vibration.

5. WIRING DIAGRAM (RECOIL STARTER MODELS)



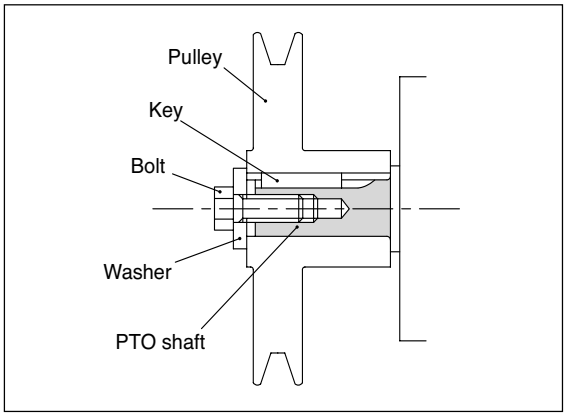
WIRING DIAGRAM (ELECTRIC STARTER MODELS)



Optional hardware shown by dotted lines.

5. BELT PULLEY INSTALLATION ONTO KEYWAY-TYPE CRANKSHAFT

When installing the belt pulley and/or clutch onto keyway-type crankshaft (PTO shaft), proper and correct arrangements are needed. The following illustration shows the correct installation of the applicable component parts.



■ **Metric keyway-type crankshaft**

Washer; Use the washer (material; SS41P) with the thickness described below;

	EX13/17/21	EX27	EX35/40
Washer Thickness mm	4.5 or over		6.0 or over
ROBIN genuine part	020-00801-40, Washer	020-00800-20, Washer	020-01002-20, Washer
Thickness; mm	4.5	4.5	6.0
OD; mm	28	35	40
ID; mm	8.5	8.5	10.5
Material;	SS41P	SS41P	SS41P

Bolt; Select the proper bolt and tighten it to the specified tightening torque, as mentioned below;

	EX13/17/21	EX27	EX35/40
Effective thread length mm	16 to 22	18 to 27	18 to 27
Strength	"8T" or higher		
Tightening Torque N•m(kgf•cm)	20 - 22 (204 - 224)		40 - 50 (408 - 510)
ROBIN genuine parts (Screw length; mm)	011-00802-50, Flange Bolt 25		011-01003-00, Flange Bolt 30

■ **SAE (inch) keyway-type crankshaft**

Washer; Use the washer (material; SS41P) with the thickness described below;

	EX13/17/21	EX27	EX35/40
Washer Thickness in. (mm)	0.177 (4.5) or over	0.248 (6.3) or over	0.236 (6.0) or over
ROBIN genuine part	020-00801-40, Washer	(NA)	(NA)
Thickness; mm	4.5		
OD; mm	28		
ID; mm	8.5		
Material;	SS41P		

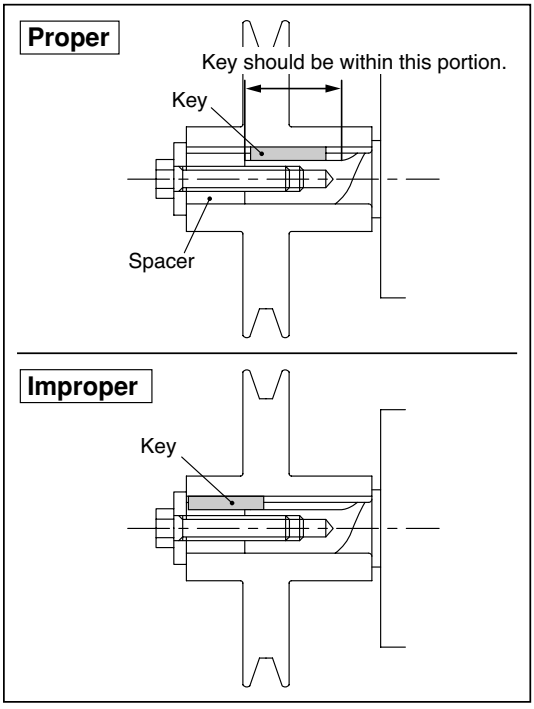
Bolt; Select the proper bolt and tighten it to the specified tightening torque, as mentioned below;

	EX13/17/21	EX27	EX35/40
Thread dimensions	5/16 – 24UNF2B	7/16 – 20UNF2B	3/8 – 24UNF2B
Effective thread length in. (mm)	0.63 to 0.87 (16 to 22)	0.71 to 1.06 (18 to 27)	0.71 to 1.06 (18 to 27)
Strength	"8T" or higher		"10T" or higher
Tightening Torque N•m(kgf•cm)(ft•lb.)	20 - 22 (204 - 224) (14.8 - 16.2)	50 - 60 (510 - 612) (36.9 - 44.3)	45 - 55 (457 - 561) (33.2 - 40.6)

(No ROBIN genuine part is available.)

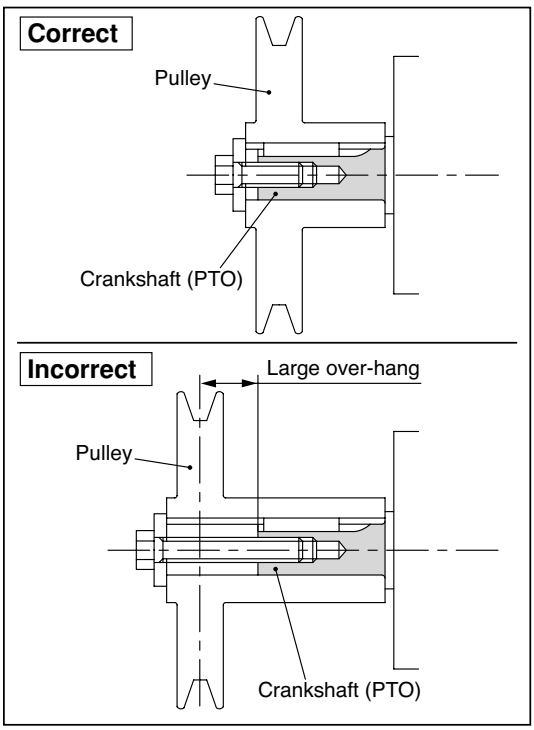
Key Location

When using the belt pulley with the extended boss on both side as shown in the illustration, put the spacer so that the key stays in the keyway portion of the crankshaft.



Belt Pulley Installation

Install the belt pulley in the no over-hang condition as shown in the illustration.

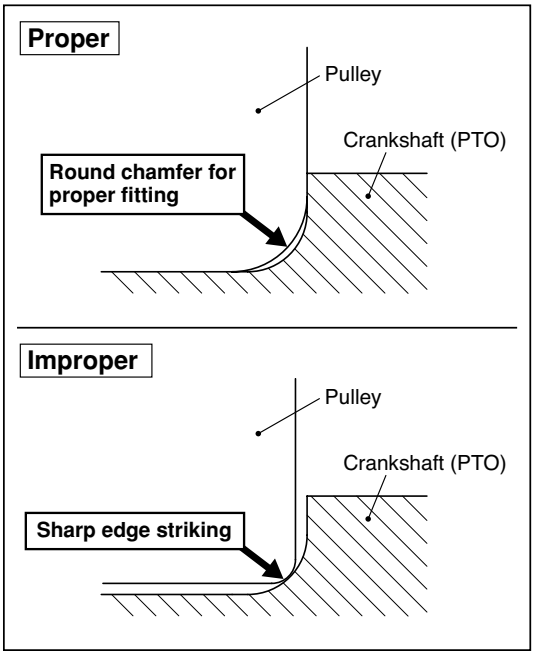


US

Pulley fitting onto PTO shoulder

For proper pulley fitting onto PTO shoulder, make round chamfer at pulley corner.

Sharp edge of pulley corner strikes PTO shoulder. In this improper condition, bolt will be loosened, and PTO damaged finally.



US

6. OPERATING YOUR ENGINE (See Fig. 4)

1. STARTING

(1) Open the fuel cock. (See Fig.4-①)

(2) Turn the STOP SWITCH to the position " **I** " (ON). (See Fig.4-②)

(3) Set the speed control lever 1/3 of the way towards the high speed position. (Except EX30) (See Fig.4-③)

(4) Close the choke lever. (See Fig.4-④)

- If the engine is cold or the ambient temperature is low, close the choke lever fully.
- If the engine is warm or the ambient temperature is high, open the choke lever half-way, or keep it fully open.

(5) Pull the starter handle slowly until resistance is felt. This is the "compression" point. Return the handle to its original position and pull swiftly. Do not pull out the rope all the way. After starting the engine, allow the starter handle to return to its original position while still holding the handle. (See Fig.4-⑤)

FOR ELECTRIC STARTER MODELS.

Insert the key into the key slot and set it at the " **I** " (ON) position. Turn it to the right (START position) to start the engine. (See Fig.4-⑤)

- Do not operate the electric starter continuously for more than 5 secounds, even if the engine dose not start.
- If the engine failed to start, set the key to the " **I** " (ON) position and wait for about 10 secounds before retrying.
- Never turn the key switch to the START position while engine is running.

(6) After starting the engine, gradually open choke by turning the choke lever and finally keep it fully opened. Do not fully open the choke lever immediately when the engine is cold or the ambient temperature is low, because the engine may stop. (See Fig.4-⑥)

2. RUNNING

(1) After the engine starts, set the speed control lever at the low speed position (L) and warm it up without load for a few minutes. (See Fig.5-①)

(2) Gradually move the speed control lever toward the high speed position (H) and set it at the required engine speed. (See Fig.5-②)

- Whenever high speed operation is not required, slow the engine down (idle) by moving the speed control lever to save fuel and extend engine life.

3. STOPPING

(1) Set the speed control lever at the low speed position and allow the engine to run at low speed for 1 or 2 minutes before stopping. (See Fig.6-①)

(2) Turn the STOP SWITCH (or KEY SWITCH) counterclockwise to the position " ○ " (OFF). (See Fig.6-②)

(3) Close the fuel cock. (See Fig.6-③)

(4) Pull the starter handle slowly and return the handle to its original position when resistance is felt. This operation is necessary to prevent outside moist air from intruding into the combustion chamber. (See Fig.6-④)

※ STOPPING ENGINE WITH THE FUEL COCK

Close the fuel cock and wait for a while until the engine stops. Avoid to let the fuel remain in the carburator over long periods, or the passages of the carburator may become clogged with impurities, and malfunctions may result.

7. MAINTENANCE

(See Fig. 7)

MAINTENANCE, REPLACEMENT, OR REPAIR OF THE EMISSION CONTROL DEVICES AND SYSTEMS MAY BE PERFORMED BY ANY NONROAD ENGINE REPAIR ESTABLISHMENT OR INDIVIDAL.

1. DAILY INSPECTION (See Fig.7-①)

Before running the engine, check the following service items.

❶ Loose or broken bolts and nuts

❷ Clean air cleaner element

❸ Enough clean engine oil

❹ Leakage of gasoline and engine oil

❺ Enough gasoline

❻ Safe surroundings

❼ Excessive vibration, noise

2. PERIODIC INSPECTION

Periodic maintenance is vital to the safe and efficient operation of your engine.
Check the table below for periodic maintenance intervals.

IT IS ALSO NECESSARY FOR THE USER OF THIS ENGINE TO CONDUCT THE MAINTENANCE AND ADJUSTMENTS ON THE EMISSION-RELATED PARTS LISTED BELOW TO KEEP THE EMISSION CONTROL SYSTEM EFFECTIVE.

The emission control system consists of the following parts :

(1) Carburetor and internal parts

(2) Cold start enrichment system, if applicable

(3) Intake manifold, if applicable

(4) Air cleaner elements

(5) Spark plug

(6) Magneto or electronic ignition system

(7) Spark advance/ retard system, if applicable

(8) Exhaust manifold, if applicable.

(9) Hoses, belts, connectors, and assembles

The maintenance schedule indicated in the following table is based on the normal engine operation.
Should the engine be operated in extremely dusty condition or in heavier loading condition, the maintenance intervals must be shortened depending on the contamination of oil, clogging of filter elements, wear of parts, and so on.

US

3. INSPECTING THE SPARK PLUG (See Fig.7-②)

(1) Clean off carbon deposits on the spark plug electrode using a plug cleaner or wire brush.

(2) Check electrode gap. The gap should be 0.6 mm to 0.7 mm (0.02 inch.-0.03 inch.). Adjust the gap, if necessary, by carefully bending the side electrode.

Recommended Spark Plug : BR-6HS (NGK)

Periodic Maintenance Schedule table **MS2230**

Maintenance Items	Every 8 hours (Daily)	Every 50 hours (Weekly)	Every 200 hours (Nonthly)	Every 500 hours	Every 1000 hours
Clean engine and check bolts and nuts	● (Daily)				
Check and refill engine oil	● (Refill daily up to upper level)				
Change engine oil (*Note 1)	● (Initial 20 hours)	● (Every 100 hours)			
Clean spark plug		● (Every 100 hours)			
Clean air cleaner		●			
Clean spark arrester (Optional part)		● (Every 100 hours)			
Replace air cleaner element			●		
Clean fuel cup			●		
Clean and adjust spark plug and electrodes			●		
Replace spark plug				●	
Remove carbon from cylinder head (*Note 2)				●	
Check and adjust valve clearance (*Note 2)				●	
Clean and adjust carburetor (*Note 2)				●	
Replace fuel lines					● (Yearly)
Overhaul engine if necessary (*Note 2)					●

*Note 1: Initial oil change should be performed after first twenty (20) hours of operation. Thereafter change oil every hundred (100) hours. Before changing oil, check for a suitable way to dispose of old oil. Do not pour it down into sewage drains, onto garden soil or into open streams. Your local zoning or environmental regulations will give you more detailed instructions on proper disposal.

*Note 2: As to the procedures for these items, please refer to the SERVICE MANUAL or consult your nearest service dealer.

4. ENGINE OIL CHANGE (See Fig. 7-③,④)

Initial oil change : After 20 hours of operation
Thereafter : Every 100 hours of operation

(1) When changing oil, stop the engine and loosen the drain plug. Drain the used oil while the engine is warm. Warm oil drains quickly and completely.

⚠ CAUTION

To prevent injury, pay attention to the hot oil.

(2) Re-install the drain plug before refilling oil.

Oil capacity (Upper level) :	(L)
EX13/17/21	0.6
EX27/30	1.0
EX35/40	1.2

US

(3) Refer to page 5 for the recommended oil.

■ Always use the best grade and clean oil. Contaminated oil, poor quality oil and shortage of oil cause damage to engine or shorten the engine life.

5. CLEANING FUEL CUP (See Fig. 7-⑤)

⚠ WARNING Flame Prohibited

(1) Inspect fuel cup for water and dirt. (See Fig.7-⑤-❶)

(2) To remove water and dirt, close the fuel cock and remove the fuel cup.

(3) After removing dirt and water, wash the fuel cup with kerosene or gasoline. Reinstall securely to prevent leakage.

6. CLEANING AIR CLEANER (See Fig.7-⑥ thru ⑩)

A dirty air cleaner element will cause starting difficulty, power loss, engine malfunctions, and shorten engine life extremely. Always keep the air cleaner element clean.

⚠ WARNING Flame Prohibited

A. Urethane Foam Element Type (See Fig.7-⑥)

Remove the element and wash it in kerosene or diesel fuel. Then saturate it in a mixture of 3 parts kerosene or diesel fuel and 1 part engine oil. Squeeze the element to remove the mixture and install it in the air cleaner. (See Fig.7-⑥-❶)

B. Dual Element Type (Urethane Foam and Paper elements) (See Fig.7-⑦)

■ Urethane Foam cleaning (See Fig.7-⑦-❶)
Wash and clean the urethane foam with detergent. After cleaning, dry it.
Clean the urethane foam every 50 hours.

■ Paper Element Cleaning (See Fig.7-⑦-❷)
Clean by tapping gently to remove dirt and blow off dust. Never use oil. Clean the paper element every 50 hours of operation, and replace element set every 200 hours.

C. Dual Element Type (Urethane Foam and Nonwoven Cloth elements) (See Fig.7-⑦)

■ Remove the urethane foam from the nonwoven cloth element and clean it in the same way as described **A**. (See Fig.7-⑦-❶)

■ Wash the element in kerosene and drain off the kerosene. Then saturate it in a mixture of **3 parts kerosene and 1 part engine oil**, wring the element to remove the mixture and install.(See Fig.7-⑦-❸)

D. For Generator Type (See Fig.7-⑧)

■ **EX17/21 (See Fig.7-⑧-❶,❷)**
Clean both elements in the same way as described **A** Urethane Foam Element Type.
Remove the frame before cleaning elements.

■ **EX27 (See Fig.7-⑧-❸,❹)**
Remove both elements and clean them in the same way as described **B** Dual Element Type (Urethane Foam and Paper elements).

E. With Pre-cleaner Type (See Fig.7-⑨)

Clean the elements (Fig.7-⑨-❶ and ❷) in the same way as described **B** Dual Element Type (Urethane Foam and Paper elements).Wash the dust pan of pre-cleaner (Fig. 7-⑨-❸) in water or kerosene and install it after drying.

F. Oil Bath Type (See Fig.7-⑩)

Clean the urethane foam (Fig. 7-⑩-❶) in the same way as described **A** Urethane Foam Element Type. Drain the dirty oil from the oil pan (Fig. 7-⑩-❷) and wash it in kerosene.
Then fill the new engine oil upto the specified oil level.

Oil Capacity in the Oil Bath (oil pan) :
EX13/17/21 . . . . . About 55 mL

NOTE
Instead of kerosene or diesel fuel, it is possible to wash the urethane foam element in a solution of mild detergent and warm water.
Then rinse the element thoroughly in clean water.
Allow the element to dry thoroughly. Soak the element in clean engine oil and squeeze out excess oil.

NOTE
Clean and replace air cleaner elements more often when operating in dusty environments. Replace the element in case that dirt or dust can not be removed and/or that the element is deformed or deteriorated.

7. FUEL HOSE REPLACEMENT (See Fig.7-⑪)

⚠ WARNING
Take extreme caution when replacing fuel hose ; gasoline is extremely flammable.

Replace the fuel hose every 2 years. If fuel leaks from fuel hose, replace the fuel hose immediately.

8. CHECKING BOLTS, NUTS AND SCREWS

- Retighten loose bolts and nuts.
- Check for fuel and oil leaks.
- Replace damaged parts with new ones.

9. CHECK BATTERY

⚠ WARNING **Flame Prohibited**

If the electrolyte fluid is below level line, refill with distilled water to the upper level line.

10. HIGH ALTITUDE ENGINE OPERATION

- Please have an authorized Robin America service dealer modify this engine if it is to be run continuously above 5000 feet (1500 meters). Failure to do so, may result in poor engine performance, spark plug fouling, hard starting, and increased emissions.
- Carburetor modification by an authorized Robin America service dealer will improve performance and allow that this engine meets EPA (Environmental Protection Agency) and California ARB (Air Resources Board) emission standards throughout its useful life.
- An engine converted for high altitudes can not be run at 5000 feet or lower. In doing so, the engine will overheat and cause serious engine damage.
  Please have an authorized Robin America service dealer restore high altitude modified engines to the original factory specification before operating below 5000 feet.

8. PREPARATIONS FOR STORAGE

1. DISCHARGE FUEL (See Fig.8-①)

⚠ WARNING **Flame Prohibited**

If you do not use the engine more than 1 month, discharge fuel to prevent gum in the fuel system and carburetor parts.

- Remove the fuel cup, place it over a container and open the fuel cock to discharge fuel from the fuel tank.
- Remove the drain screw of the carburetor float chamber and discharge fuel.

2. ENGINE OIL

- Change the engine oil with fresh oil.
- Remove the spark plug, pour about 5 cc of engine oil into the cylinder, slowly pull the starter handle of the recoil starter 2 or 3 times, and reinstall the spark plug.

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3. CLEAN AND STORE

- Slowly pull the recoil starter handle until resistance is felt and leave it in that position.
- Clean the engine thoroughly with an oiled cloth, put the cover on, and store the engine indoors in a well ventilated, low humidity area.

4. BATTERY CHARGING

⚠ WARNING **Flame Prohibited**

- The battery discharges itself even when not connected, therefore it is necessary to recharge it once a month.

9. OIL SENSOR INSTRUCTIONS
(OPTIONAL)

1. FUNCTION OF OIL SENSOR

The engine will stop automatically when the oil level falls below the safety limit. The engine cannot be started unless the level is raised above the prescribed limit. (See Fig.2-②)

2. RESTARTING

(1) Fill the crankcase with oil up to the proper level.

(2) As for restarting and operating the engine, refer to section **"6. OPERATING YOUR ENGINE"** on page 8 .

- Check the wire connector from the engine. It must be connected securely to the wire from oil sensor.
- When selecting the engine oil, refer to page 5 for the recommended oil.

10. SPARK ARRESTER (OPTIONAL)

In a dry or wooded area, it is recommendable to use the engine with a spark arrester. Some areas require the use of a spark arrester. Please check your local laws and regulations before operating your engine.

The spark arrester must be cleaned regularly to keep it functioning as designed. A clogged spark arrester:

- Prevents the flow of exhaust gas
- Reduces engine output
- Increases fuel consumption
- Makes starting difficult

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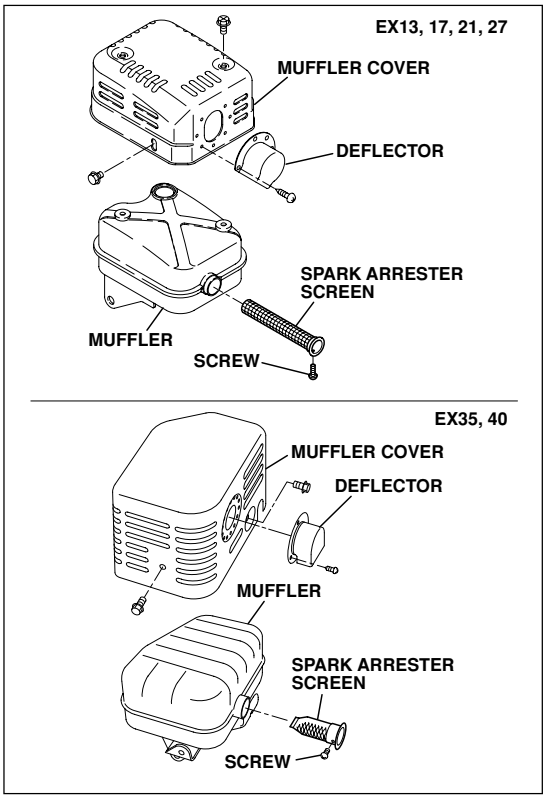
If the engine has been running, the muffler and the spark arrester will be very hot. Allow the muffler to cool before cleaning the spark arrester.

How to remove the spark arrester

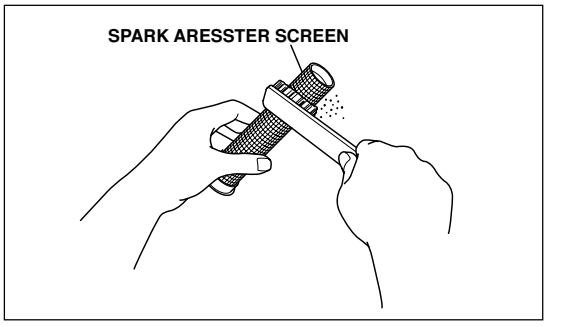
1. Remove the flange bolts from the muffler cover and remove the muffler cover.

2. Remove the special screw from the spark arrester and remove the spark arrester from the muffler.



Clean the spark arrester screen

Use a brush to remove carbon deposits from the spark arrester screen. Be careful to avoid damaging the screen. The spark arrester must be free of breaks and holes. Replace the spark arrester if it is damaged.



Install the spark arrester, and muffler protector in the reverse order of disassembly.

11. EASY TROUBLESHOOTING

WHEN ENGINE WILL NOT START :

Perform the following checks before you take the engine to your Robin dealer. If you still have trouble after completing the checks, take the engine to your nearest Robin dealer.

1. Is there a strong spark across the electrode ?

(1) Is the stop switch at position " **I** " (ON)?

(2) Remove and inspect the spark plug.
If the electrode is fouled, clean or replace it with new one.

(3) Remove the spark plug and connect it to the plug cap. Pull the starter handle while grounding spark plug against engine body. Try with a new spark plug if the spark is weak or there is no spark.
The ignition system is faulty if there is no spark with a new spark plug.

⚠ WARNING

- **Wipe out spilled fuel carefully before testing. Place spark plug as far away from spark plug hole as possible.**
- **Do not hold spark plug by hand while pulling recoil starter.**

NOTE
The engine with oil sensor will stop automatically when the oil level falls below the prescribed limit.
Unless the oil level is raised above the prescribed limit, the engine will stop immediately after starting.

2. Is there enough compression?

Pull the starter handle slowly and check if resistance is felt. If little force is required to pull the starter handle, check if the spark plug is tightened firmly. If the spark plug is loose, tighten it.

3. Is the spark plug wet with gasoline?

(1) Is the fuel cock opened?

(2) Choke (close choke lever) and pull the starter handle five or six times. Remove the plug and check if its electrode is wet. If the electrode is wet, fuel is well supplied to your engine.

(3) When the electrode is dry, check where the fuel stops. (Check the fuel intake of the carburetor.)

(4) In case the engine does not start with well supplied fuel, try using fresh fuel.

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4. Is the battery well charged?

If the battery for the electric starter is discharged, the engine will not start.

12. SPECIFICATIONS

MODEL		EX13D	EX17D	EX21D	EX27D
Type		Air-cooled, 4-cycle single cylinder, overhead camshaft, gasoline engine			
Displacement	mL (cc)	126	169	211	265
Continuous Output	kW/rpm (HP/rpm)	2.2/3600 (3.0/3600)	2.9/3600 (4.0/3600)	3.7/3600 (5.0/3600)	5.1/3600 (7.0/3600)
Maximum Output	kW/rpm (HP/rpm)	3.2/4000 (4.3/4000)	4.2/4000 (5.7/4000)	5.1/4000 (7.0/4000)	6.6/4000 (9.0/4000)
Direction of Rotation		Counterclockwise, as Viewed from P.T.O. Shaft side			
Lubricant		Automotive detergent oil (API/ SE or higher grade, SAE/ 10W-30 etc.)			
Oil Capacity	Liter	0.6			1.0
Fuel		Automotive Gasoline (Unleaded)			
Fuel Tank Capacity	Liter	2.7	3.6		6.1
Spark Plug		NGK BR-6HS			
Starting System		Recoil starter	Recoil starter / Electric starter		
Dry Weight	kg	14	15	16	21
Dimensions	(L x W x H) mm	297 x 341 x 318	304 x 354 x 335	311 x 366 x 335	355 x 420 x 410
Valve Clearance (Intake and Exhaust)		0.12 $^{+0.03}_{0}$ mm (0.0047 $^{+0.0012}_{0}$ in.)			
		Note : Adjust the valve clearance while the engine is cold.			
Emissions Durability Period (California only)		250 hours			

MODEL		EX30D	EX35D		EX40D	
Type		Air-cooled, 4-cycle single cylinder, overhead camshaft, gasoline engine				
Displacement	mL (cc)	287	404			
Continuous Output	kW/rpm (HP/rpm)	5.5/3600 (7.5/3600)	6.3/3600 (8.5/3600)		7.0/3600 (9.5/3600)	
Maximum Output	kW/rpm (HP/rpm)	6.6/4000 (9.0/4000)	Net	Gross	Net	Gross
			7.4/3600 (10.0/3600)	8.8/3600 (12.0/3600)	8.8/3600 (12.0/3600)	10.3/3600 (14.0/3600)
Direction of Rotation		Counterclockwise, as Viewed from P.T.O. Shaft side				
Lubricant		Automotive detergent oil (API/ SE or higher grade, SAE/ 10W-30 etc.)				
Oil Capacity	Liter	1.0	1.2			
Fuel		Automotive Gasoline (Unleaded)				
Fuel Tank Capacity	Liter	—	7.0			
Spark Plug		NGK BR-6HS				
Starting System		Recoil starter / Electric starter				
Dry Weight	kg	21	33			
Dimensions	(L x W x H) mm	415 x 424 x 319	389 x 450 x 443			
Valve Clearance (Intake and Exhaust)		0.12 $^{+0.03}_{0}$ mm (0.0047 $^{+0.0012}_{0}$ in.)				
		Note : Adjust the valve clearance while the engine is cold.				
Emissions Durability Period (California only)		500 hours	250 hours			

- **Specifications are subject to change without notice**
- **Cold and damp weather conditions might cause your engine to trouble occasionally. Engine operation in the cold weather condition will be improved by means of optional "Cold Weather Kit". Please consult with your nearest ROBIN dealer or distributor.**
- **The following optional parts are also available at ROBIN distributor and/or dealer ;**
  1. Air Cleaner ; Oil bath type, Pre-cleaner type etc.
  2. Magneto for lighting usage ; 12V-15W/40W/200W
  3. Fuel Tank with fuel level gauge

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